

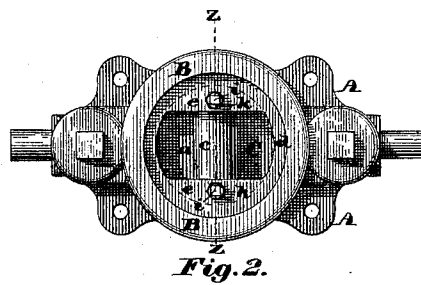
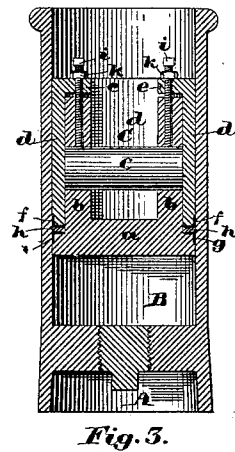
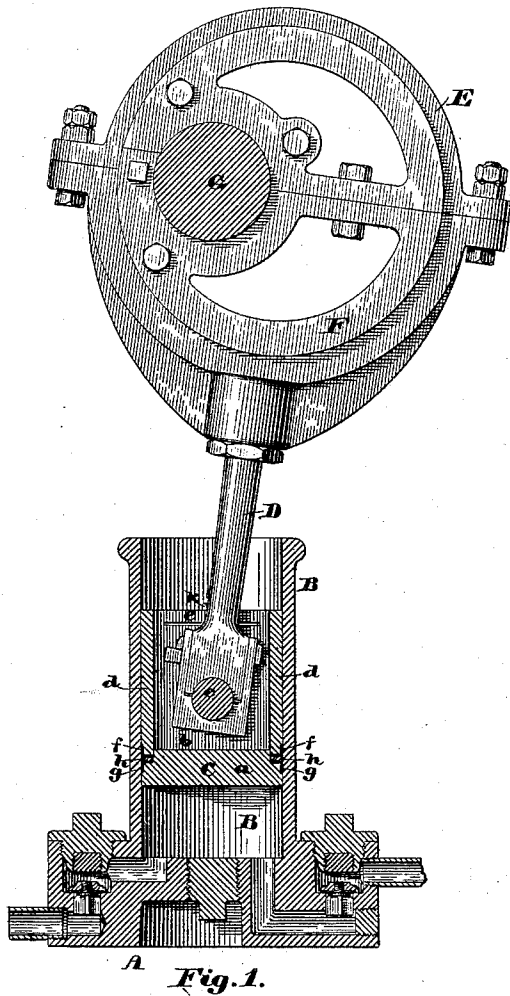
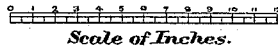
(No Model.)

J. A. WOODBURY, J. MERRILL, G. PATTEN &  
E. F. WOODBURY.

PISTON FOR AIR PUMPS.

No. 331,360.

Patented Dec. 1, 1885.



Witnesses:

*Walter E. Lombard.*  
*Frank C. Gray.*

Inventors:

*James A. Woodbury, Joshua Merrill,*  
*George Patten, Edward F. Woodbury.*

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Attorney.

# UNITED STATES PATENT OFFICE.

JAMES A. WOODBURY, OF WINCHESTER, AND JOSHUA MERRILL, GEORGE PATTEN, AND EDWARD F. WOODBURY, OF BOSTON, MASSACHUSETTS.

## PISTON FOR AIR-PUMPS.

SPECIFICATION forming part of Letters Patent No. 331,360, dated December 1, 1885.

Application filed April 13, 1885. Serial No. 163,039. (No model.)

*To all whom it may concern:*

Be it known that we, JAMES A. WOODBURY, of Winchester, in the county of Middlesex, and JOSHUA MERRILL, GEORGE PATTEN, and EDWARD F. WOODBURY, of Boston, in the county of Suffolk, and all in the State of Massachusetts, have invented, jointly, new and useful Improvements in Pistons for Air-Pumps and other Purposes, of which the following, taken in connection with the accompanying drawings, is a specification.

Our invention relates to pistons for air-pumps and other purposes, and is shown and described in another application of ours, filed May 16, 1883, No. 95,078, of which this is a division; and it consists in certain novel features of construction, arrangement, and combination of parts, which will be readily understood by reference to the description of the drawings and to the claims to be hereinafter given.

Figure 1 of the drawings is a central vertical section of an air-pump containing our improved piston applied thereto. Fig. 2 is a plan of the pump-cylinder, base, and piston, and Fig. 3 is a vertical section of the same on line *z z* on Fig. 2.

In the drawings, A is the base of the pump, from which rises the pump-cylinder B, in which the piston C is operated by the eccentric-rod D, eccentric-strap E, and the eccentric F, mounted upon the shaft G of an air-engine in a well-known manner.

The piston C is composed of the head *a*, provided with the upwardly-projecting and segmentally-shaped ears *b b*, in which is set the wrist-pin *c*. The diameter or distance across from the curved surface of one ear to the curved surface of the other ear is considerably less than the interior diameter of the pump-cylinder or the diameter of the head *a*, or such that they will just fit into the interior of the cylinder *d*, which is provided at its upper end with two inwardly-projecting segmentally-shaped flanges *e e*, which project inward over the ears *b b*, as shown in Fig. 3.

Between the lower end of the cylinder *d* and the head *a* are placed two cupped leather packing-rings, *f* and *g*, and the metallic ring *h*, the whole being secured together by the screw-studs *i*, which pass freely through the flanges

*e* and are screwed into the ears *b b*, and press upon the wrist-pin *c* to prevent it from turning, and the nuts *k*, mounted upon said studs and screwed down upon the flanges *e e*, all as shown in Figs. 2 and 3.

We have found serious difficulty in working air-pumps successfully in forcing air under pressures—say equal to three, four, or more atmospheres—when the piston packings were secured by means of a follower or clamping-ring bolted to the under or inner side of the piston, by reason of the bolts or fastenings becoming loose and interfering with the proper action of the pump, and therefore we have constructed the pump-pistons in the manner described, with the result of entirely obviating this difficulty.

The subject-matter of this application is also described and shown, but not claimed, in another application, filed January 15, 1885, as a division of the first-cited application, and numbered 152,985.

What we claim as new, and desire to secure by Letters Patent of the United States, is—

1. A piston composed of the head *a*, provided with the ears *b b*, the cylinder *d*, provided with the segmental flanges *e e*, the screw-studs *i i*, the clamping-nuts *k k*, the metal ring *h*, and the cupped leather packing-rings *f* and *g*, all united and secured together, substantially as described.

2. The combination, in a pump-piston, of the head *a*, provided with the ears *b b*, the wrist-pin *c*, mounted in said ears, the cylinder *d*, provided with the segmental flanges *e e*, the metal ring *h*, the two cupped leather packing-rings, *f* and *g*, the set-screws or studs *i i*, and the clamping-nuts *k k*, all arranged and adapted to operate substantially as and for the purposes described.

In testimony whereof we have signed our names to this specification, in the presence of two subscribing witnesses, on this 27th day of March, A. D. 1885.

JAMES A. WOODBURY.  
JOSHUA MERRILL.  
GEORGE PATTEN.  
EDWARD F. WOODBURY.

Witnesses:

WALTER E. LOMBARD,  
FRANK E. BRAY.